

# Dileptons from Transport and Hydrodynamical Models \*

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Transport and hydrodynamical models used to describe the expansion stage of a heavy-ion collisions at the CERN SPS give different dilepton spectra even if the calculation is constrained to reproduce the observed hadron spectra [1]. To understand the origin of this difference we have used both transport and hydrodynamical models to calculate electron pair emission from a fireball consisting only of pions and rho mesons. We also compare results obtained assuming zero and finite pion chemical potential in hydrodynamic model.

The  $p_t$  spectra of pions in all three cases is shown in fig. 1. The slopes of the  $p_t$  spectra show that that the effective equations of state of the transport model and pion number conserving hydro are relatively similar whereas the equation of state of the hydrodynamic model with zero chemical potential is stiffer.

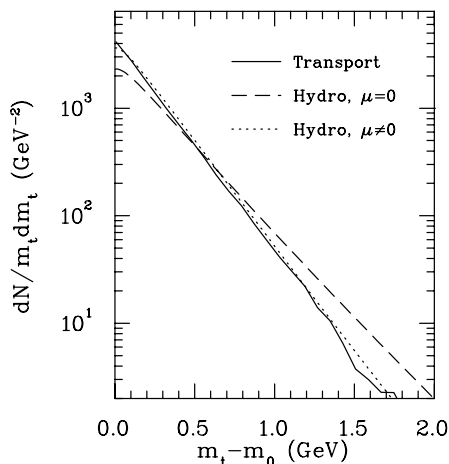


Figure 1: The  $p_t$  spectra of pions from transport and hydrodynamical models.

Fig. 2 depicts the distribution of lepton pairs originating from  $\pi\pi$  annihilations during the system evolution. The most striking feature is that

the difference between the two hydrodynamical models is tiny. The effect of increasing chemical potential and thus larger pion density is counterbalanced by the shorter lifetime and faster cooling of the system leading to practically indistinguishable dilepton yields.

Since the transport model and the hydrodynamic model lead to similar pion spectra their dilepton yields can be compared without reservations. The difference between these models is similar to that seen in the attempts to reproduce the CERES data. This supports our hypothesis that details of expansion dynamics do have a significant effect on the dilepton production. The shapes of the distributions look like the system in transport description cools faster but lives longer than in hydro. Whether this is the case remains to be investigated in more detail.

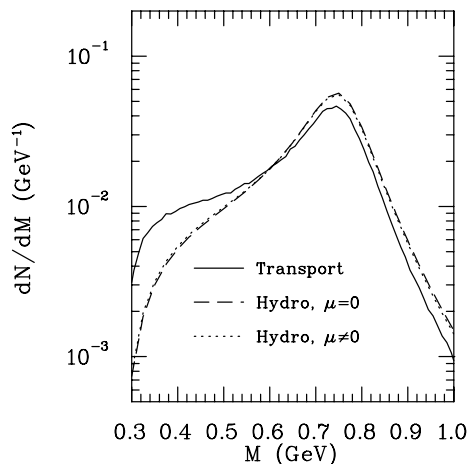


Figure 2: The mass distribution of lepton pairs from  $\pi\pi$  annihilation in transport and hydrodynamical models.

## References

- [1] R. Rapp, Nucl. Phys. A **661**, 33 (1999)

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